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Heart Failure and Cardiomyopathies

LUNG ULTRASOUND WITH POCKET DEVICE MAY DETECT SUBCLINICAL CONGESTION IN AMBULATORY HEART FAILURE PATIENTS

Moderated Poster Contributions
Heart Failure and Cardiomyopathies Moderated Poster Theater, Poster Hall B1
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Session Title: Novel Applications of Echo Imaging in Heart Failure
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Authors: *Elke Platz, Eldrin Lewis, Julie M. Peck, Emanuele Pivetta, Allison A. Merz, Dorothea Hempel, Christina Wilson, Sarah E. Frasure, Susan Cheng, Scott Solomon, Brigham and Women's Hospital, Boston, MA, USA*

Background: Pulmonary congestion is a common sign of heart failure (HF) and a prognostic marker for HF readmissions and mortality. While traditional methods to assess pulmonary congestion are insensitive, lung ultrasound (LUS) may detect subclinical pulmonary edema.

Methods: During cardiology clinic visits 189 patients with prior HF hospitalization, NYHA class II-IV and without structural lung disease underwent routine clinical exam by cardiology providers blinded to LUS findings. LUS was performed by trained investigators in 8 chest zones with a pocket ultrasound device (median exam duration 2 min.) and analyzed offline, blinded to clinical findings.

Results: 177 (94%) patients (age 66 years, 61% men, 72% white, ejection fraction (EF) 32%, 68% with EF≤40%) had adequate LUS images in all zones. The sum of B-lines (vertical lines on LUS) in 8 zones ranged from 0-13. Increasing B-line number (analyzed in tertiles) was associated with older age (p=0.001), male sex (p=0.017), higher NYHA class (p<0.001), lower BMI (p=0.002) and worse renal function, but was not associated with EF. Although increasing B-line number was associated with a higher proportion of patients with crackles on auscultation (p-trend=0.001), 81% of patients in the highest B-line tertile had clear lungs on auscultation (Table).

Conclusion: Our data suggest that LUS by pocket ultrasound may detect subclinical pulmonary edema in ambulatory HF patients, even in those without findings on auscultation.

Table.

	B-line tertile 1 (n=62)	B-line tertile 2 (n=56)	B-line tertile 3 (n=59)	P (trend)
Sum of B-lines in 8 chest zones (median, IQR)	0	1 (1-2)	5 (4-8)	N/A
Clinical examination (n, %)				
Jugular venous distension	11 (18)	17 (32)	22 (38)	0.017
S3/S4	1 (2)	4 (7)	4 (7)	0.20
Crackles	1 (2)	4 (7)	11 (19)	0.001
Leg edema	14 (23)	21 (39)	25 (42)	0.025
Laboratory tests (median, IQR)				
BUN (mg/dl) (n=124)	21 (16-37)	26 (20-43)	35 (27-62)	<0.001
Creatinine (mg/dl) (n=127)	1.2 (0.9-1.6)	1.3 (1.0-1.6)	1.5 (1.2-2.2)	0.002
eGFR (ml/min/1.73m2) (n=126)	54 (39-75)	51 (33-63)	45 (29-57)	0.028
NTproBNP (pg/ml) (n=49)	1119 (294-3780)	1756 (351-4049)	4900 (3157-8189)	0.005